

"EXPRESS MAILING" Mailing Label No. EL881899552 US. Date of Deposit: January 30, 2002. I hereby certify that this paper is being deposited with the U.S. Postal Service, Express Mail Post Office to Addressee Service under 37 CFR 1.10 on the date shown above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Printed Name: Lisa Lynch
Signature: Lisa Lynch

METHOD AND SYSTEM OF WIRE BONDING USING INTERPOSER PADS

Cross Reference to Related Applications

This application claims priority of U.S. Provisional Patent Application No. 60/343,652 filed on December 28, 2001 entitled "Method and System of Wire Bonding Using Interposer Pads," and the teachings are incorporated herein by reference.

Technical Field of the Invention

The present invention relates to the fabrication and packaging of semiconductor devices, specifically a method and system of bonding wires from a semiconductor die to a lead using interposer pads.

Background of the Invention

Conventionally, a semiconductor die is directly connected to a lead of a semiconductor package using bonding wires. Disadvantageously, this direct connection of a bonding wire from the semiconductor die to the lead requires a wire length of less than approximately 4 mm to

maintain wire spacing from adjacent bonding wires and reduce wire shorts during encapsulation. Longer lengths of bonding wire can be used, however such use requires kinking of the bonding wire to maintain wire spacing. Kinking the bonding wires slows the fabrication of the semiconductor package.

5

Summary of Invention

The present invention discloses a method of wire bonding a semiconductor die to a lead using interposer pads on an electro-less substrate between the semiconductor die and the lead. This method of wire bonding allows the use of combined bonding wire lengths of up to 8 mm while reducing wire sweep, wire spacing violations and wire shorts.

10

Brief Description of the Drawings

For a more complete understanding of the present invention, reference is made to the following detailed description taken in conjunction with the accompanying drawings wherein:

Figure 1 illustrates the conventional method of wire bonding from a semiconductor die to a lead.

15

Figure 2 illustrates a disclosed embodiment of the present invention.

Figure 3 illustrates the effect of kinking the bonding wire when using the conventional method of attaching the semiconductor die to the lead.

Figure 4 illustrates the elimination of the need to kink the bonding wire in the disclosed embodiment of the present invention.

maintain wire spacing from adjacent bonding wires and reduce wire shorts during encapsulation. Longer lengths of bonding wire can be used, however such use requires kinking of the bonding wire to maintain wire spacing. Kinking the bonding wires slows the fabrication of the semiconductor package.

5

Summary of Invention

The present invention discloses a method of wire bonding a semiconductor die to a lead using interposer pads on an electro-less substrate between the semiconductor die and the lead. This method of wire bonding allows the use of combined bonding wire lengths of up to 8 mm while reducing wire sweep, wire spacing violations and wire shorts.

10

Brief Description of the Drawings

For a more complete understanding of the present invention, reference is made to the following detailed description taken in conjunction with the accompanying drawings wherein:

Figure 1 illustrates the conventional method of wire bonding from a semiconductor die to a lead.

15

Figure 2 illustrates a disclosed embodiment of the present invention.

Figure 3 illustrates the effect of kinking the bonding wire when using the conventional method of attaching the semiconductor die to the lead.

Figure 4 illustrates the elimination of the need to kink the bonding wire in the disclosed embodiment of the present invention.

Figure 5 is a top view of the semiconductor die and bonding wires comparing wire sweep using the conventional method of wire bonding and wire sweep using the disclosed embodiment of the present invention.

Figure 6 is a top view of the semiconductor die and the bonding wires frame illustrating the separation of the bonding wires in the disclosed embodiment of the present invention.

Figure 7 is a magnified, top view of an interposer pad.

Detailed Description of the Invention

Throughout the drawings, it is noted that the same reference numerals will be used to designate like or equivalent elements having the same function. Detailed descriptions of known functions and constructions unnecessarily obscuring the subject matter of the present invention have been omitted for clarity.

Figure 1 illustrates the conventional method of wire bonding from semiconductor die 10 to a stitch 14 on lead 15. One end of bonding wire 13 is attached to ball bond 12 located on semiconductor die 10. The other end of bonding wire 13 is attached to stitch 14 of lead 15. Disadvantageously, this direct connection of bonding wire 13 from semiconductor die 10 to lead 15 requires bonding wire lengths of less than approximately 4 mm to maintain wire spacing and reduce wire shorts during encapsulation.

The present invention 200 is illustrated in Figure 2. It provides a method and system of wire bonding semiconductor die 10 to lead 26 using bonding wire 20 and bonding wire 24 across